

Technical Data Sheet

Eastman Tritan™ Copolyester EX501

Application/Uses

- Baby bottles
- Breast pump accessories
- Infant care
- Pacifiers
- Sippy cups

Key Attributes

- Dishwasher durability: Chemical resistance; Heat resistance; Hydrolytic stability
- Drop impact resistance
- Glass-like clarity
- Global food contact regulatory clearances
- Low taste and odor retention
- Stain resistance
- Sterilization capable via microwave steaming and boiling water immersion

Product Description

Tritan™ EX501 is an amorphous copolyester specifically developed for the Infant Care market. Its most outstanding features are consistent glass-like clarity even after multiple dishwasher cycles. Additionally, Tritan™ EX501 exhibits low taste and odor retention versus cPP, excellent drop impact resistance, and dishwasher durability. Tritan™ EX501 contains a mold release derived from vegetable based sources. Tritan™ EX501 meets infant care sterilization requirements via boiling water or microwave steam sterilization. This new-generation copolyester can also be molded into various applications without incorporating high levels of residual stress. Combined with Tritan™ copolyester's outstanding chemical resistance and hydrolytic stability, these features give molded products enhanced durability in the dishwasher environment, which can expose products to high heat, humidity, and aggressive cleaning agents.

Tritan™ EX501 can be converted into parts using injection molding, injection stretch blow molding (ISBM), and extrusion blow molding techniques.

Tritan™ EX501 copolyester may be used in repeated-use food contact articles under United States Food and Drug Administration (FDA) regulations. Contact an Eastman representative for details on global food contact regulatory clearances.

Eastman Tritan™ EX501 copolyester is included in Eastman Chemical Company's Customer Notification Procedure which details our policy for customer notification when significant changes are made in Tritan™ EX501 sold into the infant care market. This procedure provides the infant care industry an added layer of confidence in the consistent quality and performance of Tritan.

Typical Properties

Property ^a	Test ^b Method	Typical Value, Units ^c
General Properties		
Specific Gravity	D 792	1.18
Mold Shrinkage	D 955	0.005-0.007 mm/mm

Mechanical Properties

Tensile Stress @ Yield	D 638	45 MPa
Tensile Stress @ Break	D 638	56 MPa
Elongation @ Yield	D 638	6%
Elongation @ Break	D 638	176%
Tensile Modulus	D 638	1516 MPa
Flexural Yield Strength	D 790	72 MPa
Rockwell Hardness, R Scale	D 785	109
Izod Impact Strength, Notched		
@ 23°C (73°F)	D 256	1024 J/m
@ -40°C (-40°F)	D 256	136 J/m
Impact Strength, Unnotched		
@ 23°C (73°F)	D 4812	NB
@ -40°C (-40°F)	D 4812	NB
Impact Resistance (Puncture), Energy @ Max. Load		
@ 23°C (73°F)	D 3763	57 J
@ -40°C (-40°F)	D 3763	66 J

Mechanical Properties (ISO Method)

Tensile Strength @ Yield	ISO 527	44 MPa
Tensile Strength @ Break	ISO 527	55 MPa
Elongation @ Yield	ISO 527	6%
Elongation @ Break	ISO 527	151%
Tensile Modulus	ISO 527	1538 MPa
Izod Impact Strength, Notched		
@ 23°C	ISO 180	114 kJ/m ²
@ -40°C	ISO 180	14 kJ/m ²

Thermal Properties

Deflection Temperature		
@ 0.455 MPa (66 psi)	D 648	101°C
@ 1.82 MPa (264 psi)	D 648	88°C

Optical Properties

Total Transmittance	D 1003	91%
Haze	D 1003	<1%
Haze after re-equilibration (8-hr boiling)		6%

ISBM Bottle Properties

Fill Volume Shrinkage - Boiling, 1 hr d	EMN	1.9%
Fill Volume Shrinkage - Boiling, 2 hr d	EMN	2.3%
Fill Volume Shrinkage - Dishwasher (50 cycles,	EMN	0%

75°C, Residential) ^d		
Microwave Steam Sterilization (Total Energy=Wattage*Minutes) ^d	EMN	No bubbling
Microwave Boiling (Oven Power 100%) ^d	EMN	No bubbling
Drop Impact after 20 cycles Regular Steam Sterilization ^e	EMN	No crazes/no impact failures

Typical Drying Conditions

Drying Temperature	88°C (190°F)
Drying Time	4-6 hrs
Dewpoint	< -35°C (< -30°F)

Typical Processing Conditions - Injection Molding

Processing Melt Temperature	260-282°C (500-540°F)
Mold Temperature	38-66°C (100-150°F)

Typical Processing Conditions - Injection Stretch Blow Molding (ISBM)

Processing Melt Temperature	270-285°C (520-545°F)
Injection Mold Temperature	60-70°C (140-160°F)
Preform Temperature at Blow	185-195°C (365-385°F)
Primary Blow Pressure	0.03-0.08 MPa (4-12 psi)
Secondary Blow Pressure	0.2-0.3 MPa (25-40 psi)
Blow Mold Temperature	80-90°C (175-195°F)
Residual Stress Under Polarized Light, Fringe Count	<= 3

^a Unless noted otherwise, all tests are run at 23°C (73°F) and 50% relative humidity.

^b Unless noted otherwise, the test method is ASTM.

^c Units are in SI or US customary units.

^d Applies to the stretch blow molded portion only (not the injection molded preform). Properties are typical of bottles made with proper processing to minimize residual stress.

^e Bottle filled with cold water, two drops of milk added to steamer water, steam sterilized 20 cycles, then drop tested.

Comments

Properties reported here are based on limited testing. Eastman makes no representation that the material in any particular shipment will conform exactly to the values given.

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